



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/693,012	10/19/2000	David G. Boyers	101900	7407
7590 04/13/2004				
Joseph H Smith 4410 Casa Madeira Lane San Jose, CA 95127		EXAMINER WINTER, GENTLE E		
		ART UNIT PAPER NUMBER		
		1746		
DATE MAILED: 04/13/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/693,012

Applicant(s)

BOYERS ET AL.

Examiner

Gentle E. Winter

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-15,17,19-22,24-29,31-36,39,116 and 121 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-15,17,19-22,24-29,31-36,39,116 and 121 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 26 February 2004 has been entered.

Claim Rejections - 35 USC § 102--Withdrawn

1. Claims 1-7, 12, 17, 19-20, 22-29, and 31-36 and 8-11, 13-14, 16, 18, 37-39, and 116 were rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent No. 6,406,551 ('551) to Nelson. Applicant's amendments have overcome the anticipation rejection.

Claim Rejections - 35 USC § 103--Withdrawn

2. Claims 15, 120 and 121 were rejected under 35 U.S.C. 103(a) as being obvious over Nelson, in view of United States Patent No. 5,716,458 to Machino. Since the primary reference is withdrawn, the current rejection is withdrawn.

3. Claim 19, and 21 were rejected under 35 U.S.C. 103(a) as being obvious over the Nelson in view of reference *Decomposition of Ozone in Aqueous Acetic Acid Solutions* by Sehested et al. As indicated above the Nelson rejection has been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4, 6, 7, 9-13, 17, 20, 31, 33-36, 39 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 5,534,297 to Ogisu et al. hereinafter Ogisu.
2. With respect to claims 1, 2, and 31 Ogisu disclose a method for treating a material (method for surface modification see e.g. Title) comprising forming an ozone solvent solution at a first temperature by dissolving ozone gas in the passing of the solution through a heater to heat the solution (“accordingly, it is desirable that the aqueous ozone solution be heated by heater 9 to a properly decided temperature...”), and reacting the heated solution with the material a second temperature (“...temperature that is moderately low for keeping the ozone concentration as high as possible and, at the same time, moderately high for assuring a satisfactory reaction rate.”) column 15, line 24 *et seq.* The application of a stream of fluid seemingly would have the effect of rinsing. See figures 7a and 7b and relevant associated text.
3. With respect to claim 3, 4, 6, 7, and 33-36 disclosing that the second temperature is at least 5 degrees C greater than the first temperature. The claim limitations is disclosed at column 7, line 40 *et seq.* disclosing that the “...heating the aqueous ozone solution to a prescribed temperature by heater 38 provided around mixer 37.” The disclosed temperatures include values

Art Unit: 1746

between 50 and 85C. See column 7, line 65 *et seq.* 50C and column 11, line 4 discloses 65-85C.

As to claim 4, disclosing that the solution has an initial temperature between 1 and 30 C, 25 C is generally accepted as ambient and falls within the 1-30C range. Throughout the reference, the solvent is disclosed as being applied to the substrate.

4. As to claims 9-11, disclosing that the heated ozone solvent is reacted with the material within a time period after heat is first applied to said ozone solvent solution to minimize a decrease in concentration of ozone in the heated ozone solvent solution, wherein the time period is such that concentration of the heated ozone solvent solution is at the second temperature is greater than if the ozone solvent solution had been formed at said second temperature, and wherein the time period corresponds no more than a 20% decrease in the concentration of the dissolved ozone in the heated ozone solvent solution from the concentration at the first temperature. The same is disclosed at column 7, line 39 *et seq* and column 8, line 23 *et seq.*

5. As to claim 12, disclosing that a nozzle is used, the same is disclosed at figure 7(b) and relevant associated text.

6. As to claim 13, disclosing that the material is immersed in the ozone solvent material, the same is disclosed in figure 7(a) and relevant associated text.

Art Unit: 1746

7. As to claims 17, 20, and 39 disclosing injecting a pH buffer, an acid or a base the same is disclosed, albeit inherently, at column 7, line 65 *et seq* addressing controlling pH and temperature.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 5, 22, 24-29, 32 and 116 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ogisu in view of United States Patent No. 6,406,551 to Nelson.
2. With respect to claim 5, further limiting claim 3 and disclosing that the first temperature is between 1 and 10 degrees C. Each and every limitation of claim 5 is identically disclosed in Ogisu, as set forth above, except Ogisu fails to explicitly disclose the claimed temperature range. Nelson discloses the claimed temperature range “chilling the processing liquid to a temperature of from about 1 degree Celsius to about 20 degrees Celsius.” See e.g. column 7, line 40 *et seq.* and provides the explicit motivation for making the claimed combination. Namely, the ability to dissolve additional ozone in solution.

3. With specific respect to claim 22, further limiting claim 17 and disclosing the injection of a surfactant. Each and every limitation of claim 22 is identically disclosed in Ogisu, as set forth above with respect to claim 17, except that Ogisu fails to teach the addition of a surfactant.

Nelson discloses a surfactant and provides the motivation for making the combination. The addition of a surfactant is disclosed *inter alia* at column 6, line 38 *et seq.* disclosing that the processing liquid utilized in the method of the Nelson comprises *inter alia* a chemical employed in the processing liquid, includes detergents, (which inherently include surfactants). Surfactants serve as wetting agents allow for more effective interfacial contact.

4. With specific respect to claims 24-29, and 32 Ogisu discloses each and every limitation except Ogisu fails to disclose spinning the substrate, fails to explicitly disclose a rinsing step, that the material includes a substrate for use in an electronic device and the removal of organic contamination. See figures 4-6 and relevant associated text with respect to multiple nozzles and disk substrate. Nelson discloses the missing elements and provides the motivation for making the claimed combination. Nelson discloses applying the ozone solution to the substrate and rotating same about a central axis see e.g. column 18, line 20 *et seq.* Also, see e.g. column 15 and associated tables. The rinsing step is disclosed throughout see e.g. column 11, line 41 *et seq.* Semiconductor wafers are disclosed throughout Nelson as a substrate, see e.g. column 3, line 5 *et seq.* More specifically with particular respect to claim 27, it is well settled in the cleaning arts that the cleaning solution is rinsed off. To explicitly claim such a step, implicitly suggests that the step is not necessarily present in the independent claim. Applicant has acknowledged that the same is inherently present. The artisan would have been motivated to make the claimed spinning

Art Unit: 1746

substrate combination in an attempt to ensure uniform coating of the substrate and to facilitate the removal of waste reactant. A plurality of nozzles, disclosed in both references is useful as a means for ensuring complete coverage, especially with respect to 3-dimensional objects.

5. As to claim 116, disclosing Nelson discloses the step of moving the nozzles relative to the substrate. Nelson discloses the step of changing the angle with which the deionized water impinges on the substrate, see e.g. column 5, line 63 - column 6, line 1 *et seq.* The change in angle is construed to be movement relative to the substrate.

6. Claims 14, 15 and 121 are rejected under 35 U.S.C. 103(a) as being obvious over Ogisu, in view of Nelson, and further in view of United States Patent No. 5,716,458 to Machino. Each and every element of claim 14 is identically disclosed in the combination of Ogisu and Nelson, as discussed above, except Nelson fails to explicitly disclose that a heat exchanger or in-line heater may be used to provide the requisite heat. Although seemingly the heated water stream is heated with some heat exchanger. Such heating elements are disclosed in Machino. Machino discloses:

[t]he heater 11 may comprise any of that type of heaters which directly heat the mixture 1 using electricity or other heat sources, or may comprise any of that type of heaters which indirectly heat the mixture 1 using, for example, a heat exchanger which provides heat exchange between the directly heated heat transfer medium and the mixture 1. (Column 6, line 13 *et seq.*)

Art Unit: 1746

7. The artisan would have been motivated to make the instant combination because such a combination obviates the need for transport heated liquid from a distant heater, and minimizes thermal variation and waste during start-up. (Column 6, line 13 et seq.), as discussed above the heated plate will heat the liquid as it is applied to the wafer.

8. As to claim 15, disclosing that the heater comprises a heat exchanger placed “just upstream” of at least one point of reaction of the heated solvent solution with the material. See figure 1(a) of Ogisu and relevant associated text. See also column 3, line 62 et seq. of Ogisu disclosing: “Since heating of the aqueous ozone solution to a permissible maximum temperature is conducted only immediately before the solution is applied...”. Element 9 appears to be an inline heater. Ogisu additionally discloses an orifice used to apply the solvent, see e.g. figure 1b and relevant associated text.

9. Claim 19, and 21 are rejected under 35 U.S.C. 103(a) as being obvious over the Ogisu in view of Nelson and further in view of reference Decomposition of Ozone in Aqueous Acetic Acid Solutions by Sehested et al. Each and every limitation of claims 19 and 21 is identically disclosed by the combination of Ogisu and Nelson as set forth above, except the combination may not explicitly disclose that the injected chemical comprise a hydroxyl radical scavenger and an acid. Sehested et al. disclose that “acetic acid is a well known stabilizer of aqueous ozone solutions, and that acetic acid is known to scavenge the OH radical, which is the chain propagating radical in ozone decomposition.” Because it is desirable to avoid ozone decomposition (at least in solution) the artisan would have been motivated to make the instant combination.

Art Unit: 1746

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gentle E. Winter whose telephone number is (571) 272-1310.

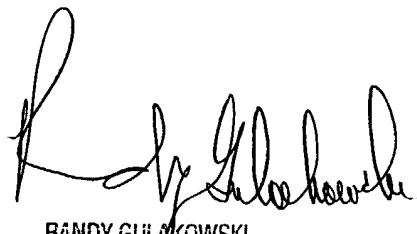
The examiner can normally be reached on Monday-Friday 7:00-3:30.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (571) 272-1302. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

12. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 273-1310.

Gentle E. Winter
Examiner
Art Unit 1746

April 9, 2004


RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700